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NAVAL WAR COLLEGE
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The Ballistic Missile Dilemma
for the Operational Commander

by

Frank K. Martin
LCDR, USN

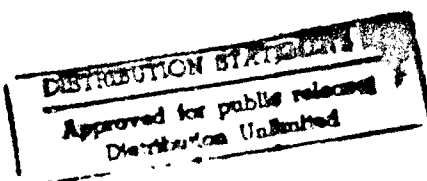
A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Operations Department.

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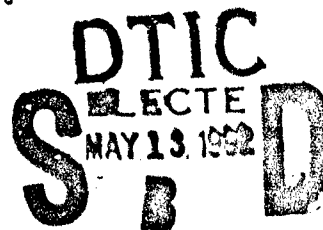
Signature: 

11 March 1992

Paper directed by
H.W. Clark, Jr., CAPT, USN
Chairman, Operations Department



200303203249



92-12651



92 5 11 123

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION/AVAILABILITY OF REPORT DISTRIBUTION STATEMENT A: Approved for Public Release; distribution is unlimited.	
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)		7a. NAME OF MONITORING ORGANIZATION	
6a. NAME OF PERFORMING ORGANIZATION OPERATIONS DEPARTMENT	6b. OFFICE SYMBOL (If applicable) C	7b. ADDRESS (City, State, and ZIP Code)	
6c. ADDRESS (City, State, and ZIP Code) NAVAL WAR COLLEGE NEWPORT, R.I. 02841		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8a. NAME OF FUNDING/SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable)	10. SOURCE OF FUNDING NUMBERS	
8c. ADDRESS (City, State, and ZIP Code)		PROGRAM ELEMENT NO.	PROJECT NO.
		TASK NO.	WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification) THE BALLISTIC MISSILE DILEMMA FOR THE OPERATIONAL COMMANDER (2)			
12. PERSONAL AUTHOR(S) LCDR FRANK K. MARTIN, USN			
13a. TYPE OF REPORT FINAL	13b. TIME COVERED FROM TO	14. DATE OF REPORT (Year, Month, Day) 11 MARCH 1992	15. PAGE COUNT 26
16. SUPPLEMENTARY NOTATION A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations. The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	
		Third World; Proliferation; Motivation; Acquisition; Ballistic	
19. ABSTRACT (Continue on reverse if necessary and identify by block number) The war with Iraq has shown the lethality and potential impact that the presence of ballistic missiles and non-conventional warheads may have in a region. The purpose of this paper is to examine the proliferation of ballistic missiles and the impact that this will have on the operational commander and his planning. The proliferation of missiles in the Third World is analyzed by examining the reasons why countries proliferate, how they procure their programs, and what the threat is. The associated area of space systems is also investigated to show how the two developments may be interrelated. Next, the impact that the presence of missiles pose on the planning and conduct of operations by the commander are explored. Finally, the possible options that the commander has in responding to the threat are analyzed. Even though the threat is very real and a major consideration in crises or conflicts, the commander does have some viable options in dealing with it. He must be aware of the capabilities and limitations of the threat and the political and military impact of its potential use and incorporate these considerations into his planning process.			
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a. NAME OF RESPONSIBLE INDIVIDUAL CHAIRMAN, OPERATIONS DEPARTMENT		22b. TELEPHONE (Include Area Code) 841-3414	22c. OFFICE SYMBOL C

Abstract of
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FOR THE OPERATIONAL COMMANDER

The war with Iraq has shown the lethality and potential impact that the presence of ballistic missiles and non-conventional warheads may have in a region. The purpose of this paper is to examine the proliferation of ballistic missiles and the impact that this will have on the operational commander and his planning. The proliferation of missiles in the Third World is analyzed by examining the reasons why countries proliferate, how they procure their programs, and what the threat is. The associated area of space systems is also investigated to show how the two developments may be interrelated. Next, the impact that the presence of missiles pose on the planning and conduct of operations by the commander are explored. Finally, the possible options that the commander has in responding to the threat are analyzed. Even though the threat is very real and a major consideration in crises or conflict, the commander does have some viable options in dealing with it. He must be aware of the capabilities and limitations of the threat and the political and military impact of its potential use and incorporate these considerations into his planning process.

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Chapter 1

INTRODUCTION

As the war with Iraq has shown, the ballistic missile has become a viable theater level threat. Third World countries who possess the capability or are on the verge of possessing it can no longer be considered third rate nations. This is even more true if the ballistic missile capability is augmented by non-conventional warhead assets. Thus, proliferation has created a number of countries capable of conducting military operations on a scale previously only engaged in by the superpowers or their closest industrialized allies.¹

The impact on U.S. policy and operations will come in various forms. Ballistic missile proliferation will complicate U.S. foreign policy, the transfer of weaponry to terrorists or sub-national groups will be more likely, and the probability of inadvertent or accidental use will be greater, which in turn will have a destabilizing effect. Moreover, at least some of the future leaders of nations possessing these capabilities are likely to be more politically unstable, aggressive and more difficult to deter.²

The impact on military operations will also be felt and the commander will have to take into account this new threat, and, in the process, may find himself constrained in his planning and operations. The commander must be aware the threat ballistic missiles pose, not only the physical capabilities and limitations, but he must also appreciate the reason countries

have deemed it necessary to acquire this capability and the political background for their potential use. Since a threat is determined by the capability and the intent to use that capability, both must be thoroughly understood and analyzed. Furthermore, the commander must understand the political implications that the threat poses.

Given that the threat is real and a potential player in most regions around the world, the commander does have some options available to counter the threat. In order to do this effectively, however, the commander must understand his own capabilities and limitations.

Missile Proliferation in the Third World

A ballistic missile is an unmanned, rocket-powered weapon, powered during the initial launch stages, but not during the descent. As a result, it follows curved, ballistic trajectory once the influence of gravity takes effect. Ballistic missiles were first used during World War II by the Germans and their V-2 rocket program. Following the war, both the U.S. and U.S.S.R. developed missile programs to deliver nuclear weapons, which in turn became the cornerstone of their deterrent postures.

However, in recent years, many other countries have become involved in developing and utilizing ballistic weapon technology and it is at the tactical and operational levels that the concern is most pronounced. Currently, at least twenty Third World countries possess missiles or are actively attempting to acquire them, and at least 16 have operational missile forces.

Furthermore, the missile development programs are often linked to efforts to produce nuclear, chemical or biological warheads.³

Appendix A shows the extent of the proliferation problem.

Motivation to Proliferate

For the first time, countries other than the superpowers are acquiring the capability to strike targets at long distances and without having to worry that the defenses might intercept or destroy the attacking force.⁴ Even though they pose a dilemma for the U.S. and her Allies, there are numerous reasons for acquiring ballistic missiles. Moreover, the trend toward further proliferation will continue because the incentives for proliferation are greater than the incentives to stop, as the "have nots" attempt to get what the "haves" have. U.S. efforts to stem this trend, either through formal agreements or through nation building and regional security efforts, have been unsuccessful.

The possession of ballistic missiles can merely demonstrate the technical sophistication of the country that owns them and, in this sense, they are seen as prestige weapons. Furthermore, and beyond the mere possession of such a capability, the ability to develop or produce them is a sign of modernization.⁵

Ballistic missiles are seen by many to be more cost effective than having a large air force capable of long range strikes. Missiles can be used in any threat environment, with a virtual assured capability of not being intercepted. Furthermore, the huge training and maintenance infrastructure

associated with air forces will not have to be maintained. Moreover, countries want the best weapon they can afford and acquire and, for many, the ballistic missile is that weapon.

Countries concerned about their perception in the eyes of others may acquire missiles in order to gain strategic status.⁶ The possession of missiles may be necessary to offset the impact of a potential adversary's possession of ballistic missiles or to offset another major military advantage. Events in the Iran-Iraq war involving the firing of ballistic missiles shows that an important aspect of a country's actual military power is defined by its possession of ballistic missiles. Aside from the potential uses that the missiles may be put to, many countries believe that they are militarily effective weapons, to be used as just another asset during a conflict.⁷

In a number of countries, missiles are viewed as strategic weapons that provide a deterrent against external threats. In this case, it appears that countries with such a capability seek to acquire non-conventional warheads for the missiles in order to enhance their deterrent value. Israel is a prime example of a country that falls into this category in that she views her arsenal of nuclear tipped Jericho missiles as a guarantee of survival. However, even though the nuclear club is growing, missiles armed with chemical agents will probably be far more common and their use more likely.⁸ The main reason for this trend may be that chemical weapons are easier to procure or manufacture than their nuclear counterparts.

Acquisition of Ballistic Missiles

Still the cheapest and easiest way of procuring missiles is from foreign sources. While the U.S. and U.S.S.R. have restricted their export of missiles and associated technologies, others, such as China and North Korea, have filled the void. Furthermore, the break-up of the Soviet Union has opened up the possibility of countries obtaining missile and non-conventional warhead technology by hiring unemployed Soviet scientists. The U.S. may counter this by hiring the scientists to assist in dismantling of the Soviet nuclear stockpiles, but this is, at best, a short term solution. The legitimate arms and technology sales in exchange for much needed hard currency or the illegitimate transfer from the loosely controlled Republics may also be sources of proliferation.

The easiest method of developing indigenous programs is to upgrade or reverse engineer existing foreign procured missile systems and modify them to extend the range or improve the warhead.⁹ A few countries have built copied-designed missiles, while others have indigenous industries to design, develop, and produce ballistic missiles.¹⁰

An additional feature of some missile programs is the development of long-range systems under the guise of commercial space programs. Civilian space launchers can be transformed into ballistic missiles. The case of India's development of the first-stage of the long-range Agni missile from the SLV-3 satellite launch vehicle is a case in point.¹¹

Chapter 2

THE THREAT

Capabilities

Ballistic missiles have several characteristics that make them useful as military weapons and political instruments. Their high speed of travel gives them a shorter time to reach a target, which can be especially valuable in conducting surprise attacks against opponents with strategic depth.¹² Moreover, the relative longer range of the missiles enables a country to strike distant, and previously unreachable, targets.

Because there are only a few, if any, effective defenses against a missile already launched, the forces are certain to penetrate hostile territory. The arming of the missiles with non-conventional warheads makes them even more potent and could offset the lack of accuracy of many systems. Future trends in missile technology include increasingly sophisticated and more accurate missiles and solid fuel rocket motors, which will make it possible to launch them without lengthy preparations.¹³

Limitations

Most Third World missiles are of older type which lack the accuracy to be effective against point military targets.¹⁴ Even if the accuracy was good enough for effective targeting, the intelligence capability of an adversary may not support the effective targeting of military targets. Thus, unless the user has accurate and detailed information, the target list may be narrowed to only known cities and facilities. Additionally, most

missiles now in service have slow rates of fire, making the potential impact on the course of a war less.¹⁵

There are other factors which may mitigate their use. These include the training and capability of the military forces that operate the missiles, the logistics and maintenance infrastructure and requirements of the system and the status of the country's production capability. These and other factors may put a country in a position where it cannot use its ballistic missile capability effectively.¹⁶

Chapter 4

IMPACT ON OPERATIONS

The proliferation of ballistic missiles has added a new dimension to the operational level of war. Their potential use will complicate planning by potentially introducing constraints on peacetime, contingency and wartime operations. This may increase the actual likelihood of war and may also threaten U.S. and allied forces and installations previously considered safe from attack.¹⁷

Impact on Military Operations

Even though the actual physical impact on operations was slight during the war with Iraq, there are a number of impacts and considerations that the threat will impose on operations.

The potential expansion of the battlefield by the use of missiles will compound the planning and execution problem. Due to the threats capability to hit targets far removed from the front and with little or no protection available to defend against the threat, the commander will have to consider the security of far reaching assets and may be hard pressed to offer the protection required to all areas. For land forces and assets, fixed installations, such as airfields, ports, logistic, maintenance and command and control facilities, will be easier to target and will require more protection. The ability to protect mobile assets will be easier since targeting will be greatly hampered by the opponents intelligence capability and accuracy of his missile systems.

Even though the potential use of missiles against seaborne assets is not as likely due to current system constraints and limitations, their protection will also be a consideration. The forces will be harder to target due to their mobility. However, if their mission is one of presence, where their location is known, then they do not have the capability to effectively defend against the threat. Thus, the simple mission of naval presence may put that force in a very vulnerable position and the accompanying risk may not be worth the benefit derived from it. The possession of non-conventional ordnance by an adversary adds further to this problem. The effect of a nuclear, chemical or biological attack on ground or sea forces will be tremendous and will have a disruptive affect on operations.

The presence of a missile threat will also be felt in the timing aspect of operations by disrupting or delaying them. In the war with Iraq, for instance, once an actual launch was detected, the direction of the actual missile trajectory was uncertain, thereby shutting down operations in a wide area while forces sought shelter from the incoming attack. Due to the nature of the operation and the timing involved, the impact on amphibious operations could be especially acute.

The commander will also have to deal with a resource allocation problem. With the U.S. possessing only the Patriot system as a viable defense against ballistic missile attack, the available number of such systems will be a factor in determining the overall posture and security of the force. If the defense of

allied forces and cities is also a requirement, this will further strain his resources.

Impact of Political Considerations

Since the commander is tasked with maintaining regional stability, the spread of missiles will have a significant impact on his ability to do so. In some areas, the deterrent value of having a ballistic missile capability may actually contribute to stability. For instance, Israel makes no secret of the fact that she will use her missile and nuclear warhead arsenal if her survival as an independent state is threatened and is probably the main reason that a direct war between Arab states and Israel has not occurred in the recent past. More likely, however, is that in a crisis, the presence of missiles may undermine existing deterrent postures and lead to an outbreak of hostilities. In this case, stability may be undermined as states attempt to secure the upper hand by getting in the first shot before the enemies capabilities can be brought to bear. Thus, fears of missile attack against military targets or cities may lead to an adoption of pre-emptive strike against an enemy's missile capability or other serious military threat. States may also take pre-emptive action because they are concerned about the enemy's capability to escalate the war into the non-conventional arena.¹⁸ In either case, the threshold for war is lowered, and the idea of using an asset before losing it may make the war option more attractive. Thus, one of the most notable impacts of ballistic missiles is that they enhance the incentives to strike

first, either as part of a pre-meditated offensive move or as a pre-emptive action during a crisis.¹⁰

The political impact is also present in the relationships with allies. The possession of ballistic missile and non-conventional ordnance by a regional power may affect the willingness of other countries to participate in or support U.S. actions. With the exception of the Patriot system, the U.S. has little to offer in the form of protection for an ally open to missile attack by an adversary. Conversely, a country may be more receptive to U.S. involvement in a regional crisis or conflict due to the very fact that the U.S. may be able to offer protection against missile attack.

Another consideration in this area was exhibited in the war with Iraq. Iraq attempted to break-up the fragile Allied coalition by drawing Israel into the conflict. Had this occurred, the potential for some Arab countries to leave the coalition would have been substantial in that they viewed Israel a greater threat than Iraq. The U.S. was able to counter the threat with the infusion of Patriot systems into Israel, and this, coupled with the effective Israeli civil defense program, kept Israel from striking back. Had un-conventional warheads been employed, the U.S. would have been hard pressed to keep Israel from conducting offensive operations against Iraq, and the solidarity of the allied coalition might have been shaken.

This example also brought out the relationship between political considerations and military operations in that it

became imperative to neutralize the Scud threat for the reasons mentioned above. To do this, hundred of coalition sorties were sent on Scud-hunting missions and an elaborate command and control system was developed to detect Scud launches and direct aircraft to the area to destroy the launchers. Since this was only effective after a launch had occurred, Special Forces were used in an attempt to locate and destroy the launchers prior to missile launch.¹⁰ Thus, in future operations, the commander may have to divert military forces to similar anti-ballistic missile missions when they might be more effectively used against other targets.

Impact of Space Programs

A corollary to ballistic missile development is that some countries are actively and concurrently developing space programs. A potential adversary may possess the capability to utilize space borne assets to gather intelligence and other information more readily than if he had to acquire it from other sources. Furthermore, the possession of satellites for communications purposes will make his command and control much easier. The U.S. currently has no capability to affect this directly since she does not possess an anti-satellite capability, and the only remaining way to interdict this capability would be to go after the ground-based support infrastructure.

Conversely, the capability of by an opponents space program gives him the potential to disrupt our use of space. As is readily apparent, the U.S. has come to depend on space for a wide

variety of uses, from intelligence gathering to navigation, the loss of which would severely hamper the commander's capability to effectively plan and conduct operations. Furthermore, aside from having an actual space program, a country having a ballistic missile capability may possess the additional capability to affect the U.S. use of space. One of the simplest forms of doing this would involve the use of a booster to scatter debris in the path of a target satellite or to equip their missiles with a conventional warhead and use them as kinetic-kill direct-ascent ASATs.²¹ However, this would involve some fairly sophisticated support systems, and currently, only those countries with indigenous space systems have the potential of doing this.

Chapter 5

THE RESPONSE

Since the ballistic missile problem is not going away and will, in fact, figure more prominently in future operations, the operational commander will have to consider various methods and options to deal with the threat. As in any operation, the actions need not stand alone and several may run concurrently with each other. Furthermore, the political situation and Rules of Engagement will have a major impact on the actions the commander takes.

Intelligence

The area of intelligence will take on a greater role in responding to the threat and will be the basis of any action the commander may contemplate. In short, he needs to be better informed, so that he can better gauge and analyze the situation, and make the best decision.

Information on the missile and non-conventional ordnance capabilities and limitations that a country possesses will be important in determining the threat that it poses to operations and friendly forces. Additionally, an indication of the intent of the country's leadership as to when and where they might use missiles will play a part in assessing the threat and formulating plans. Finally, intelligence plays the most vital role in attempting to target launchers and other facilities, for without accurate and timely information, the targeting of the facilities will be nearly impossible.

Conversely, attempts at denying intelligence to the adversary is also an important aspect of countering the threat. His intelligence problem will have the same constraints as our own, probably on a much greater scale. By making his targeting problem difficult, friendly military forces and installations may be protected from missile attack. The use of deception, diversion and dispersal are some of the means of complicating the targeting problem.

Direct Military Action

The most straightforward approach to countering the threat is to conduct direct military action in order to neutralize the opponents capability. The target of the action can be the launch platforms or non-conventional ordnance stockpiles themselves, or the infrastructure supporting the program.

However, the execution aspect of this course of action is very difficult to carry out. In the first place, the intelligence for such an operation will have to be flawless. The location of missile launch facilities and supporting infrastructures need to be pin-pointed and identified for effective targeting. The presence of mobile launchers will multiply the complexity of the problem and, in reality, one can never be absolutely certain that all of the targets have been located. Moreover, once the targets have been located and identified, the next problem becomes what assets to use against the targets. This decision will be based on the assets the commander has available to him and the urgency associated with

the action. The political considerations may force the commander to devote a larger portion of his effort in this direction than would militarily be necessary.

The complexity of this undertaking was clearly shown during the war with Iraq. The actual locations of the fixed launchers were fairly well known, but the mobile launchers took a long time to find and, in most cases, were they only located after launching missiles. Once the missile was launched, the launcher moved to a new location and the process of locating and targeting would have start all over. This cat and mouse game was terminated only with the end of the war itself.

Pre-emption

Another way to neutralize the threat, especially if it is already well established, is through pre-emptive action. However, the act of pre-emption carries with it the connotation of firing the first bullet; in effect, starting the war. Thus, the political situation will have to be known and analyzed well in advance and the target nation will have to be isolated politically so that the act itself is seen as being necessary for the welfare and stability of other nations. Conversely, the risk involved is that pre-emption may result in unacceptably high political costs, such as an unwanted escalation of the conflict, which would, in turn, prohibit utilizing this option.²²

If pre-emption does become a viable option, the same intelligence problems that were present with the direct military action option are also valid. Even if the targets are located

and identified, the problem becomes identifying which assets will be utilized to target the missiles and the best forces to do the mission effectively may not be available. The possession of SMART munitions will make this easier, but it will continue to be difficult to target from the air. Moreover, the insertion of Special Forces is politically more dangerous, in that the presence of troops on one's territory is different than overflight by aircraft. These problems will be exacerbated and the mission will be much harder to accomplish since this action will occur during a nominal "peacetime" condition.

Moreover, in order for pre-emption to be effective, virtually all of the capability must be taken out, or, potentially, the target state would opt to use those remaining missiles before he loses more.

Ballistic Missile Defenses

Since direct military action and pre-emption carry a lot of risk, defensive measures to neutralize the ballistic missile threat must be considered.

One way of doing this is through the use of Anti-Tactical Ballistic Missile Defense systems (ATBMS) such as the Patriot system. The system is being improved based on the experience of Desert Storm, and the tactical missile defense plans for the future involve using the system as part of the fire-control network.²³ However, the Patriot system is our only operational system with any capability of engaging ballistic missiles. Moreover, there are no weapons systems currently in the inventory

that would offer similar protection to seaborne forces. Even though there is ongoing work on modifying the Aegis radar to allow it to track ballistic missiles and launch an interceptor to destroy the incoming warhead, the system does not currently have the capability to track or engage ballistic missiles. Thus, unless there is a base established ashore where Patriot systems are located, amphibious and other seabased operations will have no defensive system capable of engaging the threat.

Tied in with this is the matter of resources available to the commander. As mentioned previously, the limited number of Patriot systems in the inventory will force the operational commander to make hard decisions as to the location and employment of the systems. If the defense of allied cities, forces and other assets must also be considered or provided for, he will have to take into account the political impact of his decision, thus further complicating the problem.

The next area of a defensive approach to the problem is the hardening and dispersion of military assets. This can lessen the impact of a successful missile hit on any one area and make the targeting problem harder for the opponent. However, there are drawbacks as well. There may no hardened facilities available for use, or the facilities available are being used by the host country. Furthermore, there are no hardened facilities for a seaborne asset, so dispersion may be the only alternative. However, by dispersing forces, the commander may lose the advantage of concentration and there are certain operations, such

as an amphibious operation, where neither courses of action are feasible.

Another consideration for the commander is the state of the civil defenses in the operating area, or the country he is supporting. The extent and sophistication of the civil defense network is important. The country's capability to weather a ballistic missile attack can determine the options available to the commander. For instance, a country with an effective system may be able to hold out for a longer period of time, allowing long term conventional operations to occur and have an effect. Little or no civil defense capability may force the operational commander into a quick resolution of the situation or even an abandonment of the operation.

Warning Systems

A viable ballistic missile defense system will rely upon an effective warning system. This is important because adequate warning time is required for the defensive efforts mentioned previously, to be effective. The use of satellite assets has made this somewhat easier, but even in today's high-tech world, warnings can be ambiguous and inaccurate.

The use of imagery from satellites suffers from the effects of weather and the information is fairly perishable, especially if the target is a mobile launcher. Additionally, the problem of getting useable information down to the level that it can be acted upon has been a major problem of the system.

The effectiveness of the early warning systems may be affected in the future by the possession of an ASAT capability by the opponent, which could destroy or otherwise render ineffective a space asset that is being used for warning and other purposes. Thus, the missile defense and warning capability may become a space control issue in the future.

Chapter 6

CONCLUSION

Ballistic missiles will allow a Third World country to expand the scope and intensity of a local conflict. On an operational level, they could potentially influence U.S. actions within a theater and jeopardize the ability to carry out independent or coalition operations.

In the future, the possession and potential use of this weapon will have to be considered by the operational commander in his planning, both for military and political factors. The implication of this is that the commander's option may be narrowed in the forces he will utilize and the areas he will operate in. Even though the sophistication of many Third World missile programs is not as extensive as our own, coupled with the use of non-conventional ordnance, the threat is very real and will continue to grow. Attempts at curbing proliferation have not been successful, and the trend will be toward more countries obtaining the capability.

From the military side, the ballistic missile capability gives a foe the ability to affect operations far removed from the immediate front. For instance, bases and concentration of friendly forces behind our own lines can now be reached with virtual immunity and the hitherto safety of seaborne forces standing off some distance from the shore may no longer be counted on.

The implications in the political arena are also tremendous. The threshold for war has been lowered and the ability to diffuse regional conflicts hindered. Additionally, the long range capability of the ballistic missile may expand the battlefield into other areas and has the potential of drawing countries into a conflict or crisis.

There are no easy solutions to defeating the ballistic missile threat and each region of potential use will present its own set of unique problems. However, the user of ballistic missiles also has some problems to overcome if he wants to use them effectively. By understanding the capabilities and limitations of the threat, and by properly assessing the military and political impacts, the operational commander will be in a better position to counter it. Moreover, the commander must consider and plan for operations to offset the impact of the missile and non-conventional ordnance threat in as much detail as any other portion of his overall operation.

APPENDIX I

THIRD WORLD BALLISTIC MISSILE, NON- CONVENTIONAL WEAPONS AND SPACE PROGRAMS

COUNTRY	BALLISTIC MISSILE	CHEMICAL WEAPON	BIOLOGICAL WEAPON	NUCLEAR WEAPON	SPACE PROGRAM
Afghanistan	Yes				
Argentina	Yes			Planned	Planned
Brazil	Yes	Possible		Possible	Yes
Egypt	Yes	Likely			
India	Yes	Likely		Yes	Yes
Indonesia	Planned	Possible			Planned
Iran	Yes	Likely			
Iraq	Likely	Likely			
Israel	Yes	Likely	Likely	Yes	Yes
Korea, North	Yes	Likely	Likely	Possible	
Korea, South	Yes	Likely			
Libya	Yes	Likely			
Pakistan	Yes	Likely		Likely	
Saudi Arabia	Yes	Possible			
South Africa	Yes	Possible		Likely	Planned
Syria	Yes	Likely	Likely		
Taiwan	Yes	Likely	Likely		Planned
Thailand	Possible	Possible			
Vietnam	Possible	Likely			
Yemen	Yes				

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